

Radiological situation in forests of Ukraine on late phase of the Chernobyl disaster

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Abstract

Chernobyl accident (1986) led to contamination with ^{137}Cs of more than 1 million hectares of forests in Ukraine (density $>40 \text{ kBq}\cdot\text{m}^{-2}$). During first two decades, milk and meat were major source for internal doses of population. Currently, more than half of cases of excess of permissible levels (PL) (^{137}Cs) derived from forest products - wild mushrooms, berries, meat. Activity concentration of ^{137}Cs in dried mushrooms outside the Chernobyl Exclusion Zone (ChEZ) can be two-three orders of magnitude (up to $3\text{MBq}\cdot\text{kg}^{-1}$) higher than PL ($2.5 \text{ kBq}\cdot\text{kg}^{-1}$). ChEZ and its vicinity contaminated with ^{90}Sr with a density of more than $5.5 \text{ kBq}\cdot\text{m}^{-2}$, where ^{90}Sr activity concentration in fuelwood may exceed PL ($60 \text{ Bq}\cdot\text{kg}^{-1}$). The radiological threat of wildfires in ChEZ for firefighters and population has been evaluated.

Distribution, depots and fluxes of ^{90}Sr and ^{137}Cs in forest ecosystems were studied. Currently, up to 10% of ^{137}Cs located in biomass of pine forests and up to 40% in litter. Due to high mobility of ^{90}Sr in sandy soils, its content in 20-cm root layer of pine forests has decreased up to 20% of total amount in ecosystem because of intensive root uptake ($> 50\%$) and vertical migration in soil ($> 20\%$) so TF of ^{90}Sr increased of more than order of magnitude over the last 20-30 years. Radionuclides have lower bioavailability in deciduous forests compared to coniferous. The data on the non-uniform distribution of ^{90}Sr and ^{137}Cs in wood of pine and birch trees for typical forest stands presented.

Presentation language

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